The Air Line Pilot

July-August, 1954

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A Pilot View of Jets

This report, presented at the Air Safety Forum, takes a look at jets and outlines the opinion of at least one air line pilot who has flown them.

By Fred Illuston

In presenting notes on the pilot's viewpoint of jet operations, I have selected three general subjects: (1) Gas Turbines; (2) High Altitude Flight; (3) Jet Characteristics.

Gas Turbines

The gas turbine represents a radically new and basically simpler power plant, capable of carrying on in the high power ranges where the piston engine is limited.

The change over to jets tends to simplify all controls relating to engine operation, with a resultant simplification of power management. For example, one power control or throttle, controls power output throughout the operating range of the engine. Propeller controls and attendant complicated and troublesome equipment are completely eliminated. The necessity for figuring numerous complicated power settings of boost vs. r.p.m. vs. BMEP vs. altitude vs. mixture is eliminated.

Mixture and carburetor heat controls do not exist. Cowl flaps and their management are eliminated. Runups and general throttle manipulation are simple. The throttle is commonly set for 100 per cent r.p.m. during the runup and left there throughout the take-off and climb to altitude.

There may be additional auxiliary controls added to control new devices such as:

- Reverse thrust
- Improved fuel scheduling
- Improved water injection
- Improved afterburning
- Variable inlet guide vanes
- Compressor bleed
- Compressor air inlet duct shut-offs

Overriding Controls Needed

In every case above, actuating mechanisms are involved, which while normally automatic, must lend themselves to some form of manual control from the cockpit, in the event of malfunction or the desire to override.

It is generally conceded, especially by the pilot group, that an all weather Jet Transport must have reverse thrust to operate successfully in this country. It is inconceivable that we could shoot a 300—¾ approach at Chicago for example, and brake a 130,000 pounds of clean airplane to a normal stop on snow or ice, by means of wheel brakes alone. Failure of the brakes would be catastrophic. Failure of the flaps and dive brakes to extend, would also prove very sporting. It is true that a lightly loaded four engined jet such as the B-45, can be brought to a stop in the first 4,500 feet of a dry runway, but this bears little resemblance to the type of operation we contemplate. It is to the credit of development engineers in this country, that we insist on having reverse thrust available at all times for Jet Transports.

Fuel Scheduling

Improved fuel scheduling is an important development of interest to all of us. You will recall many hairy reports of flame-outs, blow-outs, die-outs, hot starts and what have you. These have been the bane of jet jockeys since May 11, 1941, when the first jet as we know them today, was first flown by the British. These particular incidents can all be traced to a fuel scheduling device; an accessory not unlike a carburetor in its objective. The jet engine proper has suffered undue humiliations at the hands of this ill-conceived device, designed to supply the engine with the proper amount of fuel under any and all conditions of operation. Fortunately for us, fuel scheduling devices have received the undivided attention of jet engine experts the world over. Today, the hot starts, flame-outs, etc., are fast becoming history. Today we have electronic fuel scheduling for example, which is designed to protect the engine

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Ed Modes, Editor

against any improper throttle movement by the pilot, and at the same time provide optimum engine performance. In addition, this system permits automatic starts by simply flipping a switch. Unlike the piston engine, the gas turbine is less versatile altitude wise, and thrives best at high altitude, high speed and at very nearly maximum output. We achieve little advantage in endurance when the need arises, by the simple expedient of throttling back. Also, we are left little choice in the selection of altitudes. Any operation conducted at low levels, as for example, a climb delayed by ATC or a desire on our part to climb out low under nearby frontal activity, results in excessive pounds per mile consumption. The jet will cover roughly twice as much ground at altitude, as it will at sea level for the same amount of fuel.

Engine Reliability

Engine reliability is now very close to that of the piston engine, and in many cases better. Part of the problem has been to take advantage of the beneficial effects of using high temperatures, while at the same time preserving adequate strength and life in the metals involved. For example, in a typical turbojet the temperature in the nozzle box area may run 1,650° F. or higher, while the turbine bucket temperature may run 1,400° F. or higher. It is said that a bucket, while rotating at 8,000 r.p.m. can exert a centrifugal pull at its root of approximately five tons. The importance of containing the bucket on the turbine wheel can hardly be overestimated.

High Altitude Flight

Theoretically at least, the stratosphere starts at about 35,300 feet above sea level. Here, isothermal conditions of about —65° F. are supposed to exist. In actual practice, we have found that between 35,000 and 45,000 feet the temperature varies from —30° F. to —100° F. The jet engine thrives best on cold air and performance is based generally on isothermal conditions. Therefore, we will need accurate temperature aloft forecasts to do a precise job of flight planning. For example the rate of climb performance of a typical jet at 40,000 feet, can vary from 200 to 1,600 feet per minute depending on the temperature experienced.

Jet streams or just plain high winds at altitude are beginning to be better understood. From our experience we can at least verify their existence up to 200 m.p.h. on many occasions. High westerly winds can prove a formidable obstacle to westbound flights. To escape them generally results in a lower and less economical cruising altitude. We need accurate winds aloft forecasts to balance these factors out to arrive at an optimum altitude.

Disadvantages

To appreciate the effects of altitude on the human body, we should visit a pressure chamber and be instructed by a competent physiologist. By participating, we discover first hand, the insidious effects of anoxia. We can actually observe the tell-tale signs such as clammy skin, loss of color in the finger nails, ears, etc. We find that the frequent use of oxygen at our contemplated cabin altitudes of 8,000 to 10,000 feet is very beneficial, especially at night. We learn our limitations, in the event of a decompression and ignoring the use of oxygen. Complete loss of consciousness with little or no warning occurs about as follows: at 25,000 feet —3 minutes, at 40,000 feet—8 seconds, at 50,000-52,000 feet, oxygen plus a pressure suit is required. We must conclude that decompressions, fire warnings real or false, failure of the heating system, etc., are far more serious than is presently the case.

Advantages

One big advantage to high altitude flight is generally clear skies aloft. Although we have climbed from about 600 to 38,000 feet on solid instruments, this was rare exception. Such stratified clouds as do exist at 40,000 feet are usually a hazy type formation with no icing problem involved, due to the extremely low moisture content of the air at these temperatures. We have circled a few cumulo-nimbus formations at above 40,000 feet and would estimate the tops at 65,000 feet or higher. These formations were isolated and clearly defined.

Jet Characteristics

The record shows that turbojet propulsive efficiency at low speeds leaves much to be desired. The use of the newer higher powered engines coupled with powerful rocket assist units has done much to improve take-off performance for the Military. In all probability, we will rely on the improved thrust of the newer engines made possible in part by the use of augmentors such as water injection, ducted fan types and possibly afterburning. The use of longer runways may nullify the important deleterious effects of high ambient temperature. The effort required to handle an engine out at V. is considerably less than is presently the case with propeller driven aircraft. Yaw is at a minimum. Complicated and potentially dangerous feathering procedures are eliminated. The principal step is simply retarding the throttle to "stop-cock-off" position, thereby cutting off all fuel to the engine. On the other hand, loss of an engine at altitude, usually results in an enforced lower and less economical cruising altitude. Lowered range then becomes a problem on long flights, particularly over water with no intermediate landing areas available.

Climb Speeds

Climb speeds are normally high for optimum performance, being close to the normal cruising speed. Unless we slow down from the optimum in a climb or descent through frontal conditions, a viciously rough ride can result, possibly structural failure. Typical initial climb speeds today are 450 m.p.h. By the same token, we cannot adhere to some of the complicated departure patterns during IFR conditions, and maintain this optimum schedule. Normal turns at this speed can cover 6-8 miles.

Cruising is normally accomplished by allowing the airplane to climb slightly while maintaining a predetermined optimum I.A.S. As fuel is consumed four or five thousand feet may be gradually gained depending on the weight reduction. Step cruising, where the airplane is held to predetermined altitudes, through predetermined zones may be more to the liking of ATC.

In any case, increased cruising speeds may call for some revision of our thinking as regards working conditions. Today we fly 13.8 round trips per month between New York and Chicago. Tomorrow at 500 m.p.h., we will be able to fly 25 round trips in an 85 hour month.

Holding patterns at altitude should be conservative by allowing adequate space, since the minimum or deadband idling speeds usually are such as to provide a minimum T.A.S. of 300 m.p.h. or better.

Radio Reception

Radio reception on the low frequency bands at high speed is very noisy and unreliable. High altitude cones of silence or confusion are extremely broad and inaccurate. Markers tend to overlap in areas such as New York, to the point where they are useless. DME and VHF navigational and communications frequencies should be used.

High speed dive brakes should be provided for high speed or emergency descents. These in turn, would make it possible to negotiate ILS approaches using a higher power setting, than is currently the case with many jets. The

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A 12-Hr. Pilot Flight Limit?

A proposed rule now before the CAB would make that possible. The only argument in its favor, schedule convenience, is far outweighed by the serious implications.

By Ed Modes

Hanging ominously over the heads of air line pilots today is the very real threat of a 12-hour flight time limitation.

The threat is not remote.

On May 28, the Civil Aeronautics Board issued a proposal* for industry comment that would: "permit air carriers to schedule flight crew members to fly aircraft having at least two pilots and one additional flight crew member** up to 12 hours during any 24 consecutive hours, provided that such aircraft be pressurized and that the flight be scheduled for not more than one take-off and landing."

To a pilot, approval of such a proposal means but one thing: a virtually unlimited ceiling on flight time piled on top of additional on-duty time to form a work day exceeding all bounds of reason and accepted standards of industry.

The Real Meaning

Unlike the interpretation placed on work day limits in industry, which are a maximum, flight time limitations work just the reverse. Because of the all-important words "scheduled to fly," they are actually a minimum, not in any sense a maximum. The unreconciled variables between a scheduled flight on paper and the same flight in the air seldom favor the tight, and often just plain unrealistic, schedules under which air lines operate.

An eight hour scheduled flight can easily become an actual ten-hour or more flight; a 10 hour flight, one of twelve hours. Flights scheduled for 12 hours, records show, have been known to experience actual flight times of close to 18 hours, almost six hours in excess of schedule.

For example: one air line scheduling its pilots coast to coast for about 8½ hours under a CAB waiver of the historic eight-hour rule, during one month failed to make schedule 35 times in 60 flights. Of the 35 overtime flights, 19 exceeded 9 hours, four of these being in excess of 9½ hours. Thus, it is evident, pilots flew over their scheduled time far more than within it. The scheduled limit, as pointed out before, was therefore only in the category of a minimum facing the pilot before he even took off. This is merely an example, but it is common, in varying degrees, to virtually all air line operations. Two other air lines are flying the identical schedule with a published schedule of 7 hours, 55 minutes.

Neither is the question of whether a pilot should be scheduled to fly in excess of 8 continuous hours confined in any way as a remote, one-airline, one schedule issue. By the CAB's rules-making proposal it has become industry-wide in scope.

The Timing

Perhaps a clue as to what prompts such a proposal at this time is to be found in the timing with which it was submitted to the CAB rules-making decision. It was submitted at virtually the same time the Civil Aeronautics Administrator found American Airlines' "unrealistic" coast-to-coast westbound schedule in violation of regulations and petitioned the CAB to issue a cease-and-desist order against the carrier. During this same time, the Board had AA's petition for a waiver of the eight hour rule under advisement and shortly thereafter granted the waiver.

Only arguments advanced for such a rule to date have been strictly economic in nature—essentially that the eight-hour rule hampers schedules. But the validity of such arguments are extremely flimsy. Even under the ten-hour rule, there will be those marginal schedules that would require special consideration of "just a few more minutes to make it." For 12 hour flights, it would be the same. Any cut off point, whether 8, 10 or 12 hours will inconvenience some flight, on some schedule on some air line.

Pilots maintain there are far more important aspects involved than "schedule convenience," aspects which demand the deepest exploration but have instead been only shallowly touched upon or completely ignored.

The Pilots' Attitude

If there was ever any question of whether or not the majority of pilots opposed an extension of flight time limits, the reaction to circularization of the proposed rule among the pilots in the field should serve to dispel any doubt about it.

The draft release proposal was sent to all ALPA Air Safety Chairmen, whose duty it is to obtain pilot safety opinion in each of their groups respective, and the resulting representative opinion is evident in the comment sent to the CAB on June 30: "The Association strongly opposes the waiver of flight time rules proposed for non-stop flights in Draft Release 54-16."

"It is the opinion of the Association," President Sayen emphasized, "that the majority of the Board has prejudged the proposal stated in Draft Release 54-16 (the 12 hour proposal) by the issuance of SR-405 (the special regulation granting a waiver to American). We oppose the proposal that two pilot crews may be scheduled for 12 hours of flight duty on non-stop flights, even more violently than we opposed the extension to 10 hours permitted in SR-405."

The Questions to Be Answered

In arriving at its conclusions ALPA was forced to ask itself many questions and conscientiously seek the answers. They are questions which are mandatory if a decision is to be based on the technical and safety aspects involved. To put it another way: They are questions which the CAB majority should be asking for the third time—first, before it granted any waivers; next, before it proposed such a rule; but now, most importantly, before it promulgates such a vital rule that many persons feel can do irreparable harm.

The Association's answers to these questions have their basis in past air

*CAB Draft Release 54-16.
**By definition, a third crew member could be flight engineer, flight radio operator or flight navigator.

safety experience, and day-to-day intimacy with air safety problems that are more familiar to the pilots, as operators of the nation's aircraft, than anyone else.

The questions and answers, when thoroughly studied and viewed in a perspective free from the distracting influences of politics, economics and personal pressure tell quite a story. This article is a study of those questions and answers based on ALPA's comments to the CAB on the 12-hour proposal.

Q. Is the draft release proposing the 12 hour rule proper?

A. Definitely no, it constitutes preferential treatment as a waiver as opposed to rule making.

The rule promulgated as SR-405 as a result of the petition of American Airlines for a waiver constitutes preferential treatment for one type of air carrier and for a limited group of air lines within that group. SR-405 was granted to accommodate the economic interest of a limited group of air carriers at the price of a compromise with safety from the standards now required and heretofore known in all domestic air transport. The bases on which SR-405 was promulgated are fallacious and do not constitute a proper basis for rule-making.

Q. Is SR-405 or its extension in accord with the CAB's own regulations?

A. No. On the contrary, it's in conflict with them.

For 23 years it has been contrary to federal regulations to schedule pilots for in excess of eight hours of flight duty. This rule antedates the Civil Aeronautics Act itself. It was continued as a regulation when the Act was enacted and figured prominently in the testimony as one of the protections afforded the pilots and the public. The rule has been reviewed by the Civil Aeronautics Board many times without any revision or exception being justified. The rule has been reviewed several times in recent years and has been the subject of industry discussions. Despite such review, no change has ever been made. The rule existed through the years because it was recognized that it was necessary to safe operation and that there is no equitable substitute.

Part 42 of the Civil Air Regulations provides that:

"(b) Aircraft having a crew of two pilots.

1. A pilot *shall not be scheduled to fly in excess of eight hours* during any 24-hour period unless he is given an intervening rest period at or before the termination of eight scheduled hours of flight duty. Such rest period shall equal at least twice the number of hours flown since the last preceding rest period, and in no case shall such rest period be less than eight hours. During such rest period the pilot shall be relieved of all duty with the air carrier.

2. A pilot shall not be on duty for more than 16 hours during any 24 consecutive hours.

(c) Aircraft having a crew of three pilots.

1. *A pilot shall not be scheduled for duty on the flight deck in excess of eight hours* in any 24-hour period.

2. A pilot shall not be scheduled to be aloft for more than 12 hours in any 24-hour period.

3. A pilot shall not be on duty for more than 18 hours in any 24-hour period.

(d) Aircraft having a crew of four pilots.

1. *A pilot shall not be scheduled for duty on the flight deck in excess of eight hours* during any 24-hour period.

2. A pilot shall not be on duty for more than 20 hours during any 24-hour period."

It is thus evident that the continuance of SR-405 or the promulgation of a 12-hour rule as proposed will provide one set of regulations for irregular (non-scheduled) carriers and one set, with exceptions, for scheduled carriers. Privileges will be made available to a few scheduled carriers which are denied to non-scheduled carriers.

The foregoing compels the conclusion that the instant proceeding is not one of impartial rule-making but rather an accommodation of the economic or competitive problem of a few carriers seeking preferential treatment via waivers of established safety rules.

15 HOURS PLUS: Wreckage of the recent Air France crash. The two-pilot crew had been flying over 15 hours and on duty over 18 hours at time of crash.

Q. Are the number of stops of a particular flight proper criteria upon which to base flight limits?

A. No. If they were, it would open up a whole new concept of flight limit thinking.

The 12-hour proposal has been issued upon the sole factual premise that a flight *scheduled* to be nonstop differentiates it from other flights and entitles it to special treatment. If this premise is sound, then in order to be consistent, flight time established in accordance with this criterion must go up and down the scale. For example, if a pilot is scheduled to make four stops should his flight time be reduced to six hours? And if scheduled to make eight stops, should it be reduced to four hours? And if scheduled to make sixteen stops, should it be reduced to two hours, and so forth? Obviously, many other factors, exclusive of the number of stops made, are over-riding considerations in the establishment of flight time maximums. Among these factors are the speed and complexity of the aircraft, flight problems and nervous tension, weather, noise, vibration, and anoxia. Any one of these factors are more impelling considerations than the single consideration of the number of stops to be made.

There is no factual basis for distinguishing nonstop flights from other flights. Such a determination as a sole criterion is as ridiculous as attempting to establish one set of regulations for

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flying in temperate zones and another for flying in tropical zones. It might also be suggested that regulations should differentiate between VFR and IFR flights for flight time purposes. It is obvious that such thinking will destroy the effectiveness of any rule because of the maze of "justifiable" exceptions made as "special regulations" to accommodate someone each time the rule pinches.

Q. Is the pressurization a criterion for special rule-making and a basis for extending flight time?

A. Hardly, since there's quite a bit of opinion that pressurization aggravates rather than relieves some problems.

Pressurized aircraft of today, flying at optimum performance altitudes, carry a cabin pressure altitude of approximately eight or nine thousand feet. This approximates the maximum altitude at which flights were conducted prior to the advent of pressurization and exceeds average altitudes flown in unpressurized aircraft. No relief is afforded to the pilot from the fatiguing aspects of anoxia by requiring that the nonstop equipment be pressurized. In addition, pressurization exposes the pilot to the fatigue problem of extremely dry air, poor ventilation and the constant danger of pressurization failure all with increased fatigue. It has been recognized for many years that work at altitude results in the accumulation of fatigue at a more rapid rate than for the same duties performed at sea level. It follows that 10 or 12 hours of work at eight or 10 thousand feet of altitude will produce the equivalent fatigue of many more hours of work performed at sea level. Proof is abundant that anoxia and fatigue produce carelessness, inattention, a satisfaction with a lesser degree of precision performance, and lessened muscular coordination. Yet the proposed 12-hour would permit a larger work period under such conditions in an industry requiring "the highest possible degree of safety in the public interest" (Civil Aeronautics Act. Sec. 601(b). Since the safety of the operation is the first consideration of the Board, how can it be said, in the face of these known facts, that the lengthening of the pilots' work day will not defeat this basic purpose.

Q. What inspired the most recent eight-hour flight limit rule applying to irregular carriers?

A. Unfortunate experience with more liberal regulation.

This is the most recent set of regulations adopted by the Civil Aeronautics Board on flight time and was promulgated, like the eight-hour rule requirements of Part 40, after unfortunate experience with more liberal regulation. Part 42, currently effective, is dated June 1, 1949. Part 40, which has just been under review for more than three years and has just been issued and made effective in April, 1954, contains no alteration in the eight-hour rule. It is thus evident that when all of the considerations and evidence on this subject have been impartially weighed under normal circumstances that the conclusion is reached that *there is no adequate substitute for the eight-hour rule* currently in existence.

Q. Is a rule permitting a pilot to be scheduled up to 12 hours of flight duty either realistic or entirely safe?

A. It's neither — it's unrealistic; it jeopardizes safe operation.

It should be completely obvious that a pilot who is *scheduled* for 12 hours of flight is faced with a *minimum* day, before he starts, of at least 13½ hours on duty. The exposure in terms of flight time and on-duty time over this figure is indefinite and unlimited by any regulation of the Board to the contrary. Any factor such as mechanical interruptions, passenger connections, weather difficulties, and many other conditions to which a pilot is exposed on every flight he flies may extend this minimum 13½ hour day.

It is a matter of record with the Civil Aeronautics Board in the proceeding involving a waiver of the 12-hour flight time regulation for the Korean Airlift that pilots *scheduled* for 12 hours have flown as many as 18 hours on an individual flight. Flights of 14 and 15 hours were common. Even the most uninformed layman can recognize the danger in such an operation. This action, has, nevertheless, been condoned and encouraged and now it is sought to extend the overloading of the pilot to the domestic operation.

Such conditions of work are unknown in the American way of life and in sound industrial practice. Numerous industrial studies have established that as the work day is lengthened beyond eight hours (seven hours of flying) accident proneness increases and the number of accidents increases. A study of the U. S. Labor Dept., Bureau of Labor Statistics 1947, entitled "Hours of Work and Output," establishes that—

"In general, the results of the survey indicate that work injuries increase disproportionately as daily hours increase."

In the same study, the conclusion is reached that—

"Injuries also increased as hours increased, not only in absolute numbers, but also in the rate of incidence. In most of the observed instances, the number of injuries in million hours worked was very much higher at the longer hours. Sometimes an effective accident-prevention program managed to hold the rates down to about the same level. At other times, the rates went up despite everything that was done."

Q. Is fatigue a factor?

A. It most certainly is.

Fatigue is induced by many factors, among which the most important are the maintenance of constant attention and alertness (required of pilots by the regulations), tension, constant noise and vibration (more pronounced in the DC-7, 1049 than other comparable modern long-distance aircraft), anoxia (long-distance flights must necessarily be flown at high altitudes where the cabin pressure measures eight to nine thousand feet), sitting or standing in the same position for long periods, poor ventilation, worry, and many other factors. All of these conditions are present in long-distance flights. The fact that the flight is nonstop does not relieve the pilot's exposure to any of them but, rather, prolongs it. Many pilots greatly prefer that flights be interrupted periodically so that there is a variance in their activity—opportunity to get out of the airplane to stretch and relax and to get a breath of fresh air. It also provides an opportunity to re-evaluate the problems peculiar to the flight.

The results of fatigue are well-known. Some of the most important are (1) fatigue decreases the efficiency of timing muscular movements; (2) fatigue influences the pilot's willingness to accept lower standards of accuracy in performance; (3) fatigue results in muscular actions without regard to mental process as a situation develops which requires action, although the first movement may not be the correct one; (4) fatigue results in memory deterioration, particularly as it relates to instruments not within the immediate range of vision; and (5) fatigue increases errors in flight judgment when the pilot knows he is near the termination of his flight and tends to relax. (Cambridge Cockpit Studies by Flying Personnel Research Committee, British Air Ministry, as reported in McFarland's "Human Factors in Air Transportation.")

It is nonsensical to maintain, as it has been maintained, in the attempted interpretation of SR-405, that a fatigued pilot should merely interrupt his flight. All of the pressures of his rela-

tionship with his employer, his responsibility to his passengers, and the complications of aircraft and flight routing work against such an action by the pilot.

It is equally nonsensical for an accident report to indicate that the cause of the accident was pilot error when the error of the pilot occurred after extended flight hours or on-duty hours. The conditions surrounding extended work hours have been too well-known in industry circles for many years for such fallacious reasoning to prevail.

Similarly, it is erroneous to attempt to promulgate a rule for one operation having varying characteristics and requirements by a statistical analysis of the experience on a differing operation. The problems connected with extended continuous work periods are too well-known for speculation to exist as to the effect upon a particular operation or particular individual. *This is true where the work load may be definitely anticipated and the exposures are compounded many times in aviation where a pilot preparing for a flight has no method of measuring the work load which may be required of him before he reaches the point where he may be relieved of his duties and responsibility. This is particularly true on long, nonstop flights.*

Q. Is an extra crew member justification for extending flight limits?

A. Such thinking is basically inconsistent in its premise, fallacious in its application.

Reliance upon the requirement that an "extra crew member" be carried to justify the extension of flight time in SR-405 and Draft Release 54-16, is unsound. It should be pointed out that the majority of aircraft to be utilized in such nonstop operations are of the DC-7 type. While the regulations require that a flight engineer be carried on the DC-7, the air carriers have refused, and the Civil Aeronautics Board has not required, that a station be established or a panel constructed in such a manner that the flight engineer may perform his work. Further, there is no requirement that the flight engineer be qualified as a pilot and under the regulations he is not permitted to relieve the pilot of his duties.

Further, if consistency is to be maintained contentions that an "extra crew member" justifies an extension of flight time, then it must be consistent that in any instance where the Civil Aeronautics Board approves the removal of a crew member, such as a navigator, radio operator or flight engineer from the flight crew, the flying time shall be reduced. Yet, crew member after crew member have been removed from the airplane with no revision in flight time whatsoever. It seems that, under this thinking, extra crew members or a lesser number of landings justify increased flight time for the pilot; yet a lesser number of crew members or a greater number of landings do not reduce flight time for the pilots. The inconsistency is evident.

Q. Is the fact that international flight time limits are now set at 12 hours a proper measure on which to base domestic flight time rules?

A. No, because the 12-hour international rule is in itself inadequate and has long been condemned by international pilots as such.

Part 41 of the Civil Air Regulations was promulgated immediately after World War II when international flying was in a state of development and experience had not crystallized. It was, in many ways, a temporary set of regulations to be reviewed in due time.

At the time of the drafting of the regulation, aircraft speeds were much slower than they are today and the vast majority of international flights were of such duration as to require a multiple crew. Such crews consisted of sufficient pilots to permit relief at the controls, a flight engineer, a radio operator, and a navigator. The trend since the promulgation of Part 41 has been for a steady removal of the crew members from the cockpit and assignment of their duties to the pilots.

In international flying, as in the domestic flying, the pilot on many flights has now taken over the duties of two to three flight crew members. He is now the radio operator, the navigator, and on many of the aircraft is the flight engineer, since the air carriers and the Board have steadfastly refused to provide a panel and space where the flight engineer might perform his duties. Therefore, the pilot in international flying, despite the inadequacies of navigational facilities, meteorology information, and other complications, has been steadily burdened with more and more duties and responsibilities.

It was with a view to this situation that the pilots of the international air carriers have now condemned as entirely unrealistic the flight time requirements of the present Part 41 and have requested that such regulations be brought into conformance with those of Part 42 and Part 40. It is the understanding of the Association that such a review of Part 41 is in progress. It is completely dismaying and discouraging that the opinion of the Civil Aeronautics Board, rendered in connection with SR-405 and Draft Release 54-16, should indicate that the majority of the Board have also prejudged this issue without any investigation or submission of evidence whatsoever.

It is interesting to note, in connection with the foregoing, that on many of the routes that could be flown under Part 41 with but a two-pilot crew, the air carriers are, in fact, utilizing a three-pilot crew.

It is also interesting to note the very small extent to which international routes with flight times in excess of eight hours are being flown by two-pilot crews. The vast majority of international flights are employing multiple pilot crews, such that the flying for in-

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Following is ATA's comments on Draft Release 54-16—the 12-hour rule proposed for domestic operations:

July 1, 1954

Hon. Chan Gurney, Chairman
Civil Aeronautics Board
Washington 25, D. C.

Dear Mr. Chairman:

Draft release #54-16 is concerned solely with the daily flight time limitation to be applicable to a particular type of operation, namely a domestic, long-distance nonstop operation. On behalf of the Domestic Air Line Members of the ATA, we endorse the Board's proposal to amend Part 40 so as to permit the operation of non-stop flights scheduled to exceed eight hours of flight time by a crew of two pilots and an extra crew member. Such an amendment will eliminate the principal obstacle in making available to the public non-stop long distance service anywhere within the limits of the United States. This will provide the public with more comfortable and time-saving service without any sacrifice of safety.

The airlines appreciate the opportunity afforded them to comment on the Board's proposal.

Sincerely yours,
Earl D. Johnson, President

Camera:

. . . Executive Committee Meeting August 11, 12, 13

The Dues Study Committee

The Merger Problem Committee

"Drift Down" Study Group Meets at the Home Office . . .

dividual pilots does not exceed eight hours.

The reliance in promulgating SR-405 upon the existence of the flight time limitations in Part 41 is entirely unrealistic and is a prejudgment of an issue without an examination of the evidence or facts relating thereto.

Q. Is there provision for protection of public or pilot against excessive on-duty or flight time?

A. None whatsoever.

Although in promulgating SR-405 and Draft Release 54-16 extension is sought for the flight time for which a pilot may be *scheduled,* no protection whatsoever is provided for the public or the pilot by establishing maximum actual flight times or on-duty times. The only requirement presently is that a pilot may not be *scheduled* except in accordance with certain rules which now seem to be on their way to destruction. Many of the published schedules of the air lines are presently so unrealistic that they are incapable of completion within the schedule time 10 per cent of the time. Yet no action has been taken to attempt to have these scheduling deficiencies remedied. It is a sad commentary that the safety and regularity of the airline operation should be left to the exigencies of the bargaining table rather than in the regulations.

Q. How long may a pilot be required to remain on duty?

A. Twenty-four hours a day, six days a week, is an actual possibility.

There is no requirement to the contrary. Similarly a pilot may fly for periods of indefinite duration provided only that he is not *scheduled* in excess of certain hours. Yet, it is proposed in Draft Release 54-16 to extend the permissible *scheduled* flight time without taking into consideration any of these deficiencies of the present rules.

Any action on flight time and on-duty time must necessarily encompass the entire field of the regulations. Piecemeal actions ignore the entire problem and create inequities within the regulations themselves which lead to further inequities. If the Civil Aeronautics Board intends to take any action on the matter of flight time limitations or on-duty time limitations for domestic operations, then in equity and in good conscience, they should rescind SR-405 and Draft Release 54-16 and establish a proper procedure for a complete investigation and rule making on the entire flight time and on-duty time subject.

Q. Under what conditions should even any thought be given to altering flight time limitations?

A. Only after a record of facts has been established by complete public hearings with an opportunity to submit evidence, cross examine witnesses, present proper argument, and conduct a thorough investigation of the entire subject of on-duty time and flight time.

The Association is of the opinion that this entire matter has been prejudged without a proper investigation of the facts by the issuance of SR-405 and that the rule-making contemplated, therefore, by Draft Release 54-16 is a farce. It is also viewed as a reversal of understandings reached during the entire consideration of the flight time and on-duty time subject during the recent complete review of Part 40 where this entire subject was under consideration. At no time during this entire review and industry discussions was there any contemplation that rule-making would be on a piecemeal basis so that the entire subject would be prejudged and prejudiced.

Therefore, before the Civil Aeronautics Board attempts any revision of a regulation as basic as flight time, it

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The Neutral in AA 8-Hr. Dispute

David L. Cole

David Cole has a long record as an outstanding arbiter.

Here is a thumbnail sketch of the background of David L. Cole, labor relations expert and arbiter, chosen as the neutral to hear the issues and make recommendations in the AA-pilot dispute:

He was born May 1, 1902, and attended Harvard University (S.B., 1921; LL.B., 1924).

Mr. Cole's background, as listed in the Directory of Arbitrators, published by the Bureau of National Affairs:

Formerly associate counsel, Silk Textile Code Authority, National Recovery Administration, 1934-35; chairman, New Jersey State Mediation Board, 1943-45; public member, War Labor Board, 2nd Region, 1943-45; chairman, Basic Steel, Iron Ore, and New York-New Jersey Milk Distributing Panels, War Labor Board, 1944-45; chairman, Northern Textile Commission, 1945-46; chairman, Rent Commission of Paterson, 1942-44; chairman, President's Board of Inquiry, Bituminous Coal Industry, 1948 and 1950; member, Railroad Emergency Board, in disputes between carriers and 16 non-operating employees' unions, 1948; member, President's Steel Board, 1949.

He has had considerable experience with air line labor relations and the Railway Labor Act: Chairman, emergency board, American Airlines pilot dispute, 1951; PAA-AOA seniority list integration; UAL DC-7 pegged speed, 1954; Hawaiian Airlines arbitration now in progress. He has also been selected as the arbiter for UAW-CIO jurisdictional problems.

Affiliated with American, New Jersey, and Passaic County Bar Associations; Harvard Club of New York; president, Shapiro Foundation (educational), 1934-51; trustee Rutgers Univ.; president, National Academy of Arbitrators, 1951.

Permanent arbitrator for Botany Worsted Co., Forstmann Woolen Co., New Jersey Worsted and Gera Mills and Textile Workers Union (CIO); R. Neumann & Co. and Leather Workers Union (CIO); Pantasote Co. and Textile Workers Union (CIO); Worldbestos Co. and Textile Workers Union (CIO); Flintkote Co. and Textile Workers Union (CIO); Keuffel and Esser and United Electrical Radio, and Machine Workers Union (CIO); Bigelow-Sanford Carpet Co., A. & M. Karagheusian, Inc., and Alexander Smith Co. and Textile Workers of American (CIO).

Air Safety: Too Complex a Story?

An air line pilot poses a question: Can the press get air safety facts straight, and if they can, will they publish them, regardless of big business?

By Capt. Joe Hull

Ever since the colonial days of the Boston *News-Letter*, generally conceded to be the first newspaper published in America, the newspapers have had a profound part in the shaping and growth of this great republic. The *News-Letter* first appeared in 1704 but it was not until the famous Zenger case in 1735 that news publishers began to enjoy any semblance of freedom of the press. Even then, because of fear of retaliation, most editors stifled the impluse to speak out freely against the oppressive English king and it was not until the colonies won their full independence in 1776 that real freedom of the press came about.

Down through the intervening 178 years to the present day it is doubtful if any medium has played a more important part in the shaping of America or the very thinking of its people than the daily newspapers. The power of the printed page is such that it has undoubtedly from time to time changed the course of history. Many Americans have learned to depend upon the daily journals to help them in making up their minds on controversial issues.

Implicit in the term "freedom of the press" is the right to edit the news. It is readily apparent that this places a grave responsibility upon the judgment of both publishers and editors because it puts the issue squarely up to them, leaving them with the final decision as to exactly what Americans shall or shall not read. Because of the inalienable rights bestowed upon them by our magnificent Constitution, newspaper editors are allowed to take sides on issues of the day and the editorial page of each paper reflects that particular paper's feeling on a given subject. This is in the best American tradition and it is a part of democracy at work. No true American would want to see it changed, even though he may find himself at times in complete—and violent—disagreement with the newspaper he is reading. But, as Voltaire said, "To be really free is to have power," and the implication seems clear that Voltaire feared abuse of this power.

How has the priceless heritage of 1776, freedom of the press, been received by the news writers, a powerful and select group of men and women, whose writings help to shape the course of the free world? Have they placed the proper value on the responsibility of the powerful position they hold? Have they upheld their sacred trust?

To any thinking and reading American there must have come at some time in his life the rude awakening, the disheartening realization that many of America's editors have shamefully sacrificed truth to political expediency or crass commercialism; morality to lascivious reader appeal. To this man it must come as a shock to realize that by the wilful betrayal of their blessed heritage they are taking undue advantage of the very freedom of the press which allows their frequent and intemperate aberration full rein.

Although deliberate slanting of the news was perhaps best demonstrated to this generation by the daily newspaper reporting of the recently televised political brawl in Washington, a much more cogent example to the airline pilot was the distorted and unfair publicity given the striking American Airlines pilots in the press. The vast majority of the newspapers took sides against the pilots—nothing new in pilot-management disputes. This they have the right to do; they also have the right to try to influence their readers.

But they do not have the right to distort out of all proportion the issues leading up to the strike. Nor do editors have the right to progagate and foster pernicious falsehoods about the airline pilot's duties in the cockpit, belittling his profession and conjuring up in the public's mind the mistaken idea that, with today's "magic gadgets," his job is so simple almost any nitwit can do it.

The extent to which some editors are willing to stray from the truth or into unknown fields was best expressed by one New York newspaper which, though usually conservative and reasonably accurate, went completely overboard in an editorial on August 3. It called the pilots' claims that safety was being jeopardized by the CAB's ill-advised waiver "applesauce" and characterized the pilots as "Birds in Featherbeds." This paper's surprisingly irresponsible claim that flying fatigue is unknown in today's modern transports was so embarrassingly refuted by the simultaneous headline story on the front page of Air France's crash in Connecticut on the same day that it must have made the man who wrote the editorial feel rather ridiculous when this was called to his attention by some of us who are revolted by deliberate news slanting and untrue editorial comment.

Former events should have taught us that if we are to win our battles we shall have to do it without help; the American strike only adds weight to a preponderance of evidence already available. Certainly we should never rely on the press for any assistance during trying times; it has shown itself historically to be unreliable and often more prejudiced than factual especially when the problem is at all complex, as are many of our safety problems.

We have learned an unhappy lesson from the American strike—if we did not realize it before. It is the tragic revelation that many of our great metropolitan dailies have succumbed to the demands of the advertiser or to the pressure of politics. They have forsaken or surrendered the priceless privilege and moral duty of impartial news reporting.

It is a saddening spectacle, indeed, to witness the wanton abuse of one of democracy's greatest institutions but the one ray of hope comes from the knowledge that not all newspapers slant and distort the news. In the field of American journalism there remain a

(Continued on Page 12)

few stalwart and untainted men of integrity who respect the intelligence of the reader and who recognize their duty to him. Unlike the totalitarian nations, where no news is available except the pontifications of a propagandistic press, it is still possible in America to buy an occasional newspaper whose high ideals keep it aloof from the designs of those to whom freedom of the press is but a tool. Though the number of these papers is admittedly small, it is upon them we must depend for the preservation of a right so precious that men were willing to fight and die for it.

Group Life Participation

Here are some interesting statistics on participation on the ALPA Group Life Program which went into effect August 1.

The first five air lines in order of participation, by percentage are:

New York Airways.....88%
Northwest Airlines 82%
Pioneer Airlines 82%
National Airlines 81%
Trans-Pacific 79%

The air line among the "Big 5" with the largest percentage of participation is:

Eastern 65%

The air line with the greatest number of participants is:

United 669

The six councils with the largest percentage of participation are:

National No. 73.....89%
New York No. 123.....88%
United No. 115.....88%
Pan American No. 101.....85%
Capital No. 26.....84%
Northwest No. 1.....84%

The three councils with the largest number of participants are:

Eastern No. 18.....229
Northwest No. 1.....207
Eastern No. 51.....196

Pilots and Jets . . .

(Continued from Page 3)

Flight Test Group at Wright Field proved the desirability of added drag, at low air-speeds during an ILS approach, by pulling a small 12 foot drag chute behind them. After touchdown the snap ring was pulled, permitting expansion to 32 feet for braking purposes. We might give the drag chute some thought for strictly emergency use. The use of higher drag and higher r.p.m.'s on the approach is important for two reasons:

1. High drag permits higher r.p.m.'s.
2. Higher r.p.m.'s permits more rapid acceleration to take off thrust in the event of a go-around. Drag flaps may then be retracted.

The flare, touchdown, and stall characteristics of the jet are not appreciably altered by engine speed variables, as is the case of propeller driven aircraft. Stalls are straight ahead with little or no lateral pitching.

A Challenging Problem

According to recent Air Force records, approximately 50 per cent of all jet aircraft accidents occurred during final approach, landing roll out (overshoots) and attempted go-arounds. Landing a B-45 for example is similar to landing a DC-6 or a Connie, where the propellers are left in forward pitch and the throttles set at about 18" Hg. throughout the landing roll. Thus we note the importance of providing equipment and procedures to avoid this problem in the future. The problem of stopping jets in a reasonable distance on ice remains one of the most challenging for all weather operations.

The 12-Hr. Proposal . . .

(Continued from Page 10)

is the opinion of the pilots the question should be reviewed against the entire field of flight time and on-duty time. Making such an investigation in the atmosphere of a rule already changed to further burden the pilots is not inducive to a fair consideration. It would require that the proceeding started with the promulgation of draft Release 54-16 be terminated and that this entire matter be taken to a public hearing with an opportunity for a complete presentation on the entire subject of flight time and on-duty time requirements for pilots.

The Pilot's Halo

On wings of glinting silver; over mists like wind-drift snow,
The pilot guides his eagle-craft in search of painted bow.
So frail the clouds, so finely warped, like silk for gifts of state,
Lay high above the ocean swells, thin veiled, opaque, ornate.

Far below through cobweb scarf, the ocean white with caps;
Its' clutching hands and upswept wave snatch rays in cobalt traps.
The pilot, in that world above, where peace and beauty be,
Flies close across the misty sky, his phantom bow to see.

The covenant of Noah, is God's token tendered man,
To the earth-bound only fragments, half-arched on each cloud's span.
To the flyers in their special place, where only they have been,
The color spectrums are revealed . . . rose red, stark blue, and green.

No pot of gold at end of bow . . . but, magically spun,
A mystic halo blazoned there . . . refracted from the sun.
A cameo in the middle; a silhouetted plane;
Becomes the badge, the token; and the covenant the gain.

The 'Pilot's Halo', guardian of those who challenge space,
Reflects from veils of tinted mist and shines upon each face,
As clouds disperse in empty air, Our Pilot's Halo gone,
The colors melt into the sea . . . the memory lingers on.

Frank E. Snedeker

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Meteorology and Flight Planning

If Icarus had known more about it his wings wouldn't have melted. Today the air line pilot thinks of weather in two ways, en route and terminal. A Safety Forum Report.

By W. W. Owen, EAL

Successful flight and meteorology have been close companions since man first began dreaming of flying. Weather Bureau records do not reveal the synoptic picture on the fateful day when Icarus made his amazing flight on wings of feathers and wax, but we can assume that it was not his proximity to the sun which melted the wax and caused his demise, but the fact that he was caught in the midst of a large Bermuda high with its high temperature. A pure case of not taking temperature and humidity into consideration in computing his performance figures.

Also checking the record, we find that on the day that Darius Green spun in from the bar loft in his Flying Machine, the weather was quoted "'Twas the Fourth of July, And the weather was dry, And not a cloud was on all the sky, Save a few light fleeces, Which here and there, Half mist, Half air, Like foam on the Ocean went floating by—just as lovely a morning as ever was seen for a nice little trip in a flying-machine." Obviously a hot day with little wind and we all know how poor take-off performance is on a day like that.

Meteorology and the Wrights

Then there were two bicycle mechanics named Wright. They selected a location on the North Carolina Coast where they could get steady winds blowing upslope, picked a day when the wind was right, and became the first to make a successful flight. Since that day meteorology has been occupying an increasingly vital place in aviation.

The observation of weather data and distribution of this information to all parties who are interested has kept pace with the increased demands of our faster and vastly more complex aircraft. In the days of the Fords and Condors, manually operated teletypes, aircraft upper air observations, and more widely dispersed weather stations were adequate. Now that we have speeds up to three sixty and faster, we have high altitude radiosondes, tape operated 75 wpm teletypes, more reporting stations, and many other technical aids to observing and distributing weather. On Christmas day, 1932, the Airways Observer in Philadelphia, Miss., sent the following observation to the Weather Station in Jackson, Miss., "Cloudy and Foggy, zero-zero and getting worse, pretty cold and getting colder, strong wind and getting stronger, Merry Christmas." I wonder how that would contrast to the weather that was received in Jackson on Christmas Day, 1953, from Meridian, which is near Philadelphia.

Rather than try to go into a technical discussion on matters of meteorology, I can only look at weather through the eyes of an Air Line Pilot.

The Pilot Views Weather

The air line pilot thinks of weather in two ways; enroute and terminal.

Let us first look at terminal weather.

With the advent of long range flights, terminal weather is becoming more of a factor than it was a few years ago. When we were flying shorter trips, we could depend upon nearby alternates which were adequate for our slower landing airplanes. By virtue of shorter hops, we carried a greater reserve of fuel so we could wait for improvement or pick an alternate after we found that our point of intended landing was not keeping weather minimums. Now our fuel reserves are much more limited and the number of adequate landing fields are fewer, with the result that we can't wait until the last minute to decide that we had better go some place else. We are paying a great deal more attention to the forecasts for these terminals than we did in the past. Therefore, good terminal forecasting is a prime requisite for efficient flight planning. When we start operating jets, the importance of terminal forecasts will be increased even more. The gentlemen on this panel will have much of interest on this subject.

Of equal importance to good flight planning is enroute weather. How to fly faster, smoother, and more safely is uppermost in the mind of a pilot planning a flight. Of tremendous importance in having this information available to all who may use it is the use of "pilot reports." Pireps helps the meteorologist plot the movements of fronts and squall lines; top reports and icing reports are of immeasurable assistance to a pilot in selecting the proper altitude for his flight; reports of fog banks and fog formation are of vital concern in making terminal forecasts. Every time a pilot reports his enroute weather, it is picked up and used by pilots and meteorologists all over the country. In order that your enroute reports reach the greatest number of people, it is urged that instead of using your company radio in making your enroute weather reports, you use a CAA airways communication station. In this way you will get your report on the teletype system and everyone will have it available instead of just your own company.

Pilots Can Cooperate

Every air line pilot is urged to report any weather condition he encounters which is unlike that which had been forecast or which, in his opinion might be of value to meteorologists or to other pilots who will be operating in that area. Particular attention should be paid to fronts and squall lines with emphasis on their alignment and conditions within them, unusual or unforecast winds aloft, temperature and top reports that would seem to be different from those on the forecast, advection and radiation fog formations and movements, and without delay, all reports of tornadoes, heavy hail, severe turbulence, or any condition which should be of urgent and vital interest to other pilots.

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While on the subject of pireps, I would like to see pilots observations clarified. That is, the reports that are sent by pilots on turbulence. What is light or mild to one pilot might be moderate or severe to another. I would like to see accelerometers placed on all air line aircraft so that the degree of turbulence could be evaluated and reported without the variables of opinion.

Possible Turbulence Scale

In lieu of this, I would like to see the following scale used when reporting turbulence:

Light: Choppy, no appreciable altitude fluctuations, seat-belt used only as a precaution.

Moderate: Minor altitude fluctuations, but no difficulty holding heading within 10 degrees, or airspeed within 10 knots. Seat-belt used, but no case of being actually needed.

Heavy: Altitude fluctuations not exceeding five hundred feet. Able to hold heading to within 30 degrees and airspeed to within 20 knots.

Severe: Altitude fluctuations exceeding the above limits. Heading fluctuations to extent that only able to proceed in a general direction. Requiring large power changes to keep airspeed within limits.

Extreme: No control of heading, altitude, or airspeed. Strong possibility of structural damage. An emergency condition.

A "Measuring Rod"

This proposed scale could be subject

Flier's Forum

When I read the discussion in the ALPA paper on Pilot Error I felt that some clarification of the term Pilot Error might be in order. After further study I found it could not be clarified without a definition of responsibility. In the following paragraphs I have suggested where the responsibility should be placed in each case.

The major reason for wanting to have a well written definition for Pilot Error is to place the responsibility for the accident in the right place, so that the basic cause can be ascertained and proper action taken so that it will not reoccur.

In writing a definition for Pilot Error it is necessary to consider pilot qualifications, maintenance of qualifications and responsibility for the same. It will also be necessary to consider fatigue factor, fatigue factor rate and relative fatigue factor as well as the mental preoccupation state of the pilot, and the responsibility for this.

With this in mind I have written the following definition for Pilot Error which expresses my opinion on the subject.

"Pilot Error is conscious or unconscious judgment that results in faulty action; provided that the judgment that would have resulted in correct action would not have required a greater amount of intelligence and knowledge than was possessed by the pilot and required by the company as a qualification for the job under the existing conditions."

This definition concludes the fact that judgment is the cause of the faulty action which is called Pilot Error. It is the cause of, and the responsibility for, this faulty action which we are concerned with.

Knowledge as used in this definition is education, training and experience. When the pilot was employed by the airline education, training and experience were part of the qualifications and it must be presumed that they were satisfactory else the pilot would not have been accepted. It should be a requirement of the governing agency that the airlines have ground-schools and training sections to teach the pilots new procedures, etc., and to ascertain that he has not slipped below the initial qualifications. If this were true any accident as a result of lack of knowledge could not be considered to be Pilot Error.

Intelligence level as used in this definition is the manner in which you use your knowledge to solve any particular problem. This should not be confused with an IQ. This again was a company qualification the pilot was found to have a sufficiently high intelligence level or he would not have been employed. This would at the first look indicate that any accident that was a result of low intelligence level could not be Pilot Error. This is not true, however, as mental preoccupation state is partly the responsibility of the pilot.

There are only two ways that your intelligence level can be lowered, the first is by mental degeneration. This is the responsibility of the company to see that these pilots are given jobs where their intelligence level is sufficiently high to handle the work safely. The second way to lower your intelligence level is by mental preoccupation which is an emotional state of mind. Except for fatigue, which is considered an emotion, any mental preoccupation that causes an accident can be said to be caused by Pilot Error.

Although fatigue is an emotion and comes under the heading of mental preoccupation it should be wholly the responsibility of the airline and the governing agency to see that the pilot does not exceed his maximum allowable fatigue factor. As your intelligence level is inversely proportional to your fatigue factor it follows that with an increase in fatigue factor your intelligence level will decrease. Considering this it would be necessary for the airline and the governing agency to determine what intelligence level was the minimum allowable and at what fatigue factor the pilot would arrive at this level making this his maximum allowable fatigue factor. Any accident as a result of faulty judgment where the pilot had exceeded his maximum fatigue factor could not be considered to be Pilot Error.

In a study made of airline accidents of 1952 it was suggested that 44 per cent of all airline accidents were caused by pilot error. As best I can figure this definition shows only 15.7 per cent due to pilot error.

I feel certain that if the ALPA, the ATA and the CAB would get together on common ground with an earnest desire to reduce accidents that we could reduce that 1952 figure to about 5 per cent and it would no longer be necessary to worry over a definition for Pilot Error.

Charles R. Spaulding
Council 36

to considerable revision and modification after study by the pilots, but in its final form it would constitute a measuring rod for turbulence. By use of the turbulence scale, since the terms used have a definite value, a pilot will be able to anticipate from pireps the conditions he will encounter without the variables of opinion. Frequently, after a cold front has crossed the country, and has passed on into the Atlantic, it will trail across the Florida peninsula and into the Gulf of Mexico. While it is in the Gulf, a wave will form and have a considerable effect upon the weather in the entire southeast section of the country. It is difficult, if not impossible for a meteorologist to forecast this wave formation with any degree of accuracy due to the lack of weather ships in the Gulf. I, therefore, urge the ALPA to send a recommendation to the Weather Bureau that two weather ships be located in the Gulf of Mexico, or to obtain weather reports from ships operating in the Gulf of Mexico on a year-round basis if possible, and if that is not possible, at least during the months of December, January, February, and March. Reports should be sent from a ship located east of Brownsville and south of Lake Charles, and the other reports should come from a ship west of Ft. Myers, Florida, and south of Mobile. Normal shipping could probably supply sufficient weather reports. This would prove of inestimable benefit to forecasters in plotting movements of weather which will be effecting the southeastern states in from twelve to twenty-four hours. I am quite sure that if this weather information had been available in the Gulf last spring, the National Airlines' DC-6 would have been alerted to the terrific conditions he encountered.

A Recommendation

I have one other recommendation which I would like to see adopted. So often we have been flying at two thousand feet in precipitation with the ground in plain view and had the weather reported as precipitation ceiling three hundred visibility one mile. I have checked with several people who should know and have been informed by them that if the horizontal visibility is one mile, then unless there are intervening clouds, the vertical visibility should be one mile. In fact, as a result of surface created vortex action, the greatest concentration of precipitation particles would be found near the ground, with the result that vertical visibility should be greater than horizontal visibility. Therefore, it would seem that with a visibility of one mile we should have a ceiling of 5,000. That, of course, is asking for the impossible. I propose that we utilize less than 25 per cent of the visibility and apply it as ceiling and the remaining 75 per cent of the visibility would be safety factor. It would actually be a safety factor of 400 per cent. Here is how it would work:

1 mile visibility—Precip. ceiling 1,200 (1,320 actually, but we give extra margin)

¾ mile visibility—Precip. ceiling 900 (990 actually)

½ mile visibility—Precip. ceiling 600 (660 actually)

If clouds actually exist below those levels, the ceilometer would pick them up and the ceiling would become measured and the precipitation formula would no longer apply. I am informed that with visibilities as described, the ceilometer would have no trouble picking up the base of clouds below the formula height. The beauty of this method of reporting ceilings is that it would preclude the possibility of precipitation ceilings ever closing an airport before the visibility would have done so.

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